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A further contribution on the Drosophilidae of Malaŵi, with first record of *Hypselothyrea* from the African mainland

by

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ABSTRACT

The first paper on the Malaŵian drosophilid fauna, published in the 1997 volume of this journal, reported 11 genera and 76 species, of which 16 species were newly described. Subsequent to this we studied a small complementary collection made by Londt and Stuckenberg in Malaŵi, and deposited in the Natal Museum. Although limited to 21 specimens, this collection nonetheless revealed the occurrence of 15 taxa. Among these were three genera reported for the first time from Malaŵi, namely *Cacoxenus*, *Scaptomyza* and most importantly *Hypselothyrea* (*Deplanothyrea*), which is here recorded for the first time from the African mainland. The material also included a new species, *Mycodrosophila* (*Mycodrosophila*) *barracloughi*, which is here described, and one presumably new species of *Cacoxenus* (*Gitonides*), which will be analysed further in an ongoing revision of this genus. Of the seven other taxa identified at species level, six are new records for Malaŵi. Accordingly, the Malaŵian fauna of Drosophilidae now includes 14 genera and 81 species.

RESUME

La première contribution consacrée à la faune des Drosophilidae du Malaŵi et publiée dans le volume 1997 de ce journal faisait état de 11 genres et 76 espèces dont 16 nouvelles étaient décrites. Ultérieurement, nous avons étudié une petite collection complémentaire effectuée par Londt et Stuckenberg au Malaŵi et déposée au Natal Museum. Bien que limitée à un petit lot de 21 spécimens, cette collection n'en a pas moins révélé la présence de 15 taxa. Parmi ceux-ci, ont été identifiés trois genres, rapportés pour la première fois du Malaŵi, *Cacoxenus*, *Scaptomyza* et surtout *Hypselothyrea* (*Deplanothyrea*) récolté pour la première fois sur le continent africain. Ce matériel contenait également une espèce nouvelle *Mycodrosophila* (*Mycodrosophila*) *barracloughi* dont nous donnons ici la description, et une espèce probablement nouvelle de *Cacoxenus* (*Gitonides*), qui sera analysée dans la révision du genre actuellement en cours. Des sept autres taxa identifiés au niveau de l'espèce, six sont signalés pour la première fois du Malaŵi. La faune de Drosophilidae du Malaŵi compte donc désormais 14 genres et 81 espèces.

INTRODUCTION

A first survey of the drosophilid fauna of Malaŵi (Chassagnard *et al.* 1997) reported 11 genera and 76 species, of which 16 species were newly described. We have since received for study from the Natal Museum, an additional collection of 21 specimens of Malaŵian fruitflies, collected by J. G. H. Londt and A. Londt in March 1987, and J. G. H. Londt and B. R. Stuckenberg in December 1980. Most specimens were collected at localities that were not surveyed in our previous work. A number of these came from the Ntchisi forest reserve in the Central Region of Malaŵi. One specimen from this Ntchisi collection, a male of *Drosophila* (*Drosophila*) *adamisa* Chassagnard & Tsacas, was included in Chassagnard *et al.* (1997).

It is amazing that within so small a collection there are three genera, *Cacoxenus*, *Hypselothyrea* and *Scaptomyza*, which were not amongst the 11 genera recorded previously (Chassagnard *et al.* 1997), and are therefore new records for Malaŵi. Of note is the genus *Hypselothyrea*, which is reported for the first time from the African mainland. The 21 specimens represented 15 different species, of which six are new records for Malaŵi. Among these six taxa are one new species of *Mycodrosophila* (described below), and possibly one new species of *Cacoxenus*, which will be analysed further elsewhere in an ongoing revision of this genus. Four species previously reported from Malaŵi are here reported from a new locality within the country, and five species represented by females only are classified to subgenus only. Two of these females belonging to *Drosophila* (*Drosophila*) most likely belong to a new species, the description of which is delayed until males become available.

DEPOSITORIES AND LOCALITIES

Depositories. Natal Museum in Pietermaritzburg, South Africa (NM) and Museum national d'Histoire Naturelle, Paris (MNHNP).

Collecting localities. See description of localities 1 to 6 in Chassagnard *et al.* (1997). Localities 1 and 4 are those formerly presented. Localities 7 and 8 are new.

1. *Zomba Plateau, Southern Region*, Zomba plateau forest patch, Chingwe's Hole, 12–13 March 1987.
4. *Kasungu National Park, Central Region*, Lifupa Camp, 9–10 December 1980, alt. 1000 m, *Brachystegia.*
6. *Nyika Plateau, Northern Region*, National Park, Chilinda camp, Riverine scrub, 3–4 March 1987.
7. *Ntchisi forest reserve, Central Region*, montane forest and woodland, alt. 1500 m, 3–4 December 1980. Stuckenberg (*pers. comm.*) informed us that this forest is at 13°23'S, 34°01'E, on a mountain forming part of the steep western side of the Rift Valley, overlooking Lake Malaŵi. The forest grows on the upper part of the mountain, almost to the summit, mostly on the eastern side. Because of its topographic prominence and exposure to weather conditions developing over the lake, the forest receives a very high rainfall. According to Dowsett-Lemaire (1989: 15–33, 47–48) the Ntchisi area is the most isolated submontane forest in Malaŵi. It is the only peak in the Dowa Hills still covered by forest patches in this densely cultivated and eroded district. The elevation where drosophilids were collected is at the contact between the lower edge of the *Aningeria* lower submontane forest and *Brachystegia* woodland.
8. *Mt Mulanje, Southern Region*, Likabula river valley, alt. 1000 m, 28–30 November 1980, riverine *Brachystegia* woodland. With an elevation of 3002 m Mount Mulanje is the highest peak in Malaŵi. The description of the flora and phytogeography of this area is described in Dowsett-Lemaire (1988 1989).

TAXONOMY

Family Drosophilidae

Subfamily Steganinae

Amiota (*Amiota*) sp.aff. *bandai* Chassagnard & Tsacas in Chassagnard *et al.* (1997)

Material examined: MALAŴI: 1♀, Ntchisi Forest Reserve, 1334Ac, alt. 1500 m, 3–4.xii.1980, montane forest & woodland (Londt & Stuckenberg) (NM). Registered specimen: S. F. McEvey 6573.

This female belongs to a species closely related to *A.* (*A.*) *bandai*, differing by short and large mid tarsi.

Amiota (*Phortica*) *fenestrata* (Duda, 1939)

Material examined: MALAŴI: 2♂, 1♀, Ntchisi Forest Reserve, 1334Ac, alt. 1500 m, 3–4.xii.1980, montane forest & woodland (Londt & Stuckenberg) (NM). Registered specimens: S. F. McEvey 6641, 6644, 6646; 1♂, *idem* but not registered (MNHNP).

Distribution: Mozambique, South Africa, Uganda, Malaŵi (new record).

Cacoxenus (*Gitonides*) sp.

Material examined: MALAŴI: 1♂, Mnt Mulanje, Likabula river valley, 28–30.xi.1980, 1535Dc, alt. 1000 m, Riverine *Brachystegia* woodland; 1♀, Kasungu Nat. Park, Lifupa camp, 1333Aa, 9–10.xii.1980, alt. 1000 m, *Brachystegia* (Stuckenberg & Londt) (NM). Registered specimens: S. F. McEvey 6638.

This possibly new species will be studied further in an ongoing revision of the subgenus *Cacoxenus* (*Gitonides*).

Stegana (*Steganina*) *monochrous* Tsacas, 1990

Material examined: MALAŴI: 1♀, Zomba Plateau forest patch, Chingwe's Hole, 12–13.iii.1987, SE1535AD, Malaise trap (Londt & Londt) (NM). Registered specimens: S. F. McEvey 6685.

Distribution. South Africa (Natal), Malaŵi (new record).

The species was described from Natal and this female is the first record outside South Africa.

Subfamily Drosophilinae

Drosophila (*Drosophila*) sp.

Material examined: MALAŴI: 1♀, Nyika National Park, 3–4.iii.1987, SE 1033DB, Chilinda camp riverine scrub; 1♀, Zomba Plateau forest patch, Chingwe's Hole, 12–13.iii.1987, SE 1535AD, Malaise trap (Londt & Londt) (NM). Registered specimens: S. F. McEvey 6684.

These two females most likely belong to a undescribed species; they are characterised by having the thorax pale rusty, and the abdomen entirely glossy black.

Drosophila (*Sophophora*) *seguyi* Smart, 1945

Material examined: MALAŴI: 1♂, Ntchisi Forest Reserve, 1334Ac, alt. 1500 m, 3–4.xii.1980, montane forest & woodland (Londt & Stuckenberg) (NM).

Distribution. Kenya, Tanzania, Malaŵi.

Drosophila (*Sophophora*) sp.

Material examined: MALAŴI: 1♀, Ntchisi Forest Reserve, 1334Ac, alt. 1500 m, 3–4.xii.1980, montane forest & woodland (Londt & Stuckenberg) (NM).

This female belongs to a species of the *melanogaster* group, *montium* subgroup.

Hypselothyrea (*Deplanothyrea*) sp. M

Material examined: MALAŴI: 1♀, Ntchisi Forest Reserve, 1334Ac, alt. 1500 m, 3–4.xii.1980, montane forest & woodland (Londt & Stuckenberg) (NM).

This female is the first specimen of this genus ever found on the African mainland. Uniquely, one species, *Hypselothyrea* (*Deplanothyrea*) *notabilis* (Lamb) from the Seychelles, was formerly known from the Afrotropical Region.

Moreover, in the collections of MNHNP we found 5♀ of the subgenus *Hypselothyrea* (*Deplanothyrea*) originating from four different localities in western Nigeria. Unequivocally, the 6♀ from the African mainland belong to three different species: *H.* (*D.*) sp. M (Malaŵi), *H.* (*D.*) sp. N1 (Nigeria, 1♀) and *H.* (*D.*) sp. N4 (Nigeria, 4♀), but the absence of males prevents description. The occurrence of representatives of this subgenus in such widely separated localities as Malaŵi and Nigeria suggests that the subgenus may be widespread, albeit rare throughout subsaharan Africa, and with very low population sizes. Specific and unexpected microhabitats and breeding sites may also account for why entomologists have failed to find them more frequently.

Liodrosophila melania (Séguy, 1938)

Material examined: MALAŴI: 1♂, Ntchisi Forest Reserve, 1334Ac, alt. 1500 m, 3–4.xii.1980, montane forest & woodland (Londt & Stuckenberg) (NM).

Note: While comparing this specimen with the unique holotype of *Liodrosophila melania* preserved in MNHNP, we noticed that the holotype was a male and not a female as indicated in the original description (Séguy 1938). In fact, the sign ♀ is given at the beginning of the description, but nowhere else is the sex of the holotype mentioned, and we therefore think it is a misprint.

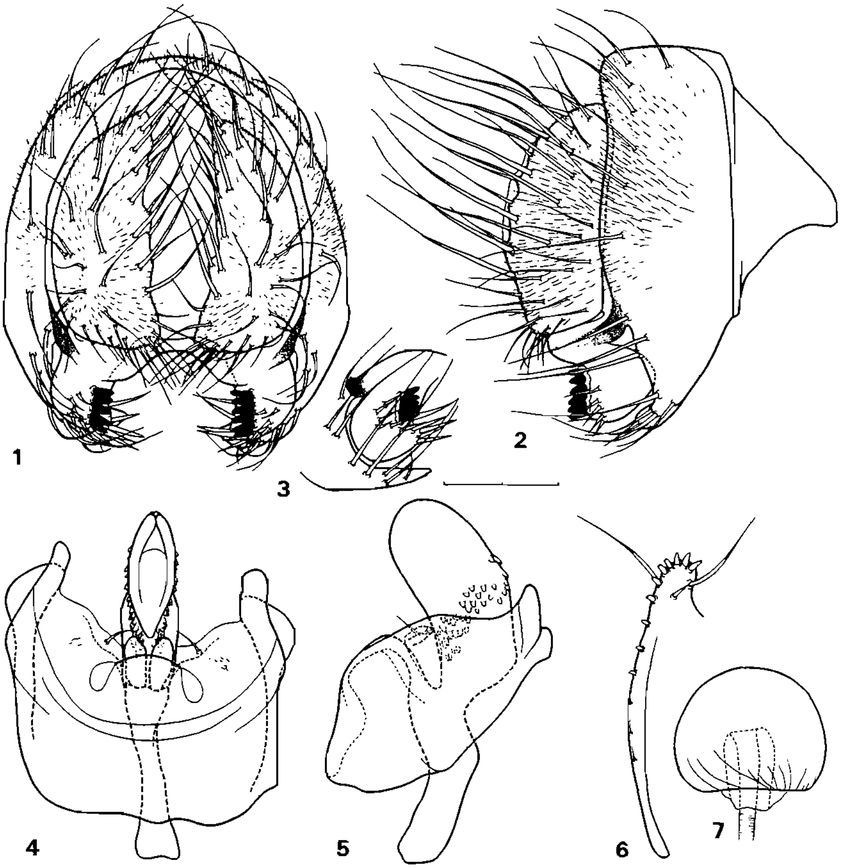
Distribution: Kenya, Malaŵi (new record).

The species was described (as *Scaptomyza*) from a single male collected in December 1932 by R. Jeannel from Mt Elgon in Kenya, and the present Malaŵian male is the first new record of the species since its description in 1938.

Mycodrosophila* (*Mycodrosophila*) *barracloughi Chassagnard & Tsacas, sp. n.

Figs 1–7

Diagnosis. Species dark, thorax black, abdomen black, yellowish ventrally and two small clear spots anteriorly on 5th tergite, legs pale but fore coxa black, wing with a brown spot extending down from lappet to mid vein (M).



Figs 1–7. *Mycodrosophila* (*Mycodrosophila*) *barracloughi* Chassagnard & Tsacas, sp. n. 1. Epandrium and associated structures, caudal view. 2. *idem*, lateral view. 3. Right surstylus. 4. Hypandrium, aedeagus and associated structures, ventral view. 5. *idem*, lateral view. 6. Ovipositor. 7. Spermatheca. Scale = 0.1 mm.

Description, ♂, ♀ :

Head. Upper frons brown like orbital plates and ocellar triangle, lower frons dull pale brown within a triangular area of which the tip reaches ocellar triangle and the base extends all over frons width, orbital plates short, glossy black, at some angles frons appears silver pollinose, ocellar triangle small and glossy black mingling with upper frons (head width /frontal width ratio *h*: *f* = ♂, 1.9–2.2, ♀ , 2.2; frontal width/ frontal height *w*: *h* = ♂, 1.3–1.4; *or*1: *or*3 = ♂, 0.8–0.9, ♀ , 0.7), *or*2 reduced to a short setula at mid distance between or*1* and or*3*. Antenna brownish yellow, flagellum darkened dorsally, densely pollinose, arista with 4 dorsal and 2 ventral long rays plus terminal fork, dorsal rays slightly bent apically. Face hardly glossy, dull rusty brown, carina almost lacking between antenna, bulging below, short and ending far from lower facial margin, peristoma undifferentiated. Clypeus long, glossy black, palpus black with 1 long subapical seta and 1 shorter basal seta with short setulae inbetween, labrum black. Gena narrow, dull brown, eyes dark red (e: g = ♂, 10, ♀ , 9).

Thorax. Scutum glossy black, anterior part most variable, some individuals being slightly paler or rusty, pronotal lobes partly rusty yellow. Acrostichal seta tiny, irregularly dispersed in *ca.* 10 rows, dorsocentral setae thin and posteriorly set, the anterior short, the posterior long. Scutellum black, hardly glossy, basal and subapical scutellar seta convergent (b: sa = ♂, 0.4–0.5, ♀, 0.5). Pleura black, sterno-index (akpst/pkpst) = ♂, 0.5–0.6, ♀, 0.6. Legs pale, glossy brownish yellow, fore femur darkened on proximal $\frac{3}{4}$ and on trochanter, coxa black. Wings slightly greyish, iridescent with an elongate, brownish spot between costal lappet and base of vein M, lappet narrow, veins brown, R_{2+3} and R_{4+5} darker apically. Halter brownish yellow. Wing indices: *L*: *w* = ♂, 2.6–2.8, ♀, 2.6, C = ♂, 1.2–1.3, C3 fringe = ♂, 68 %, ♀, 70 %.

Abdomen black, T1 and anterior area of T2 pale, lateral edge of T2 yellow, T3–T4 black, rusty laterally, T5 like T4 but with 2 narrow whitish spots on anterior edge, T6 variable between specimens ranging from completely black to mostly rusty, terminalia rusty or black.

Male terminalia. Epandrium in lateral view with even width over two-thirds dorsal area, tapering down to make a very narrow short lobe bent posteriorly, but not extending below surstylus. Epandrium covered with dense pollinosity dorso-posteriorly and bearing a row of *ca.* 10 long marginal setae on dorso-posterior edge, and a cluster of 5–6 unequal setae on ventral lobe. Epandrial fragma triangular. Surstylus elongate, bearing 6 strong prensisetae arranged in a comb-like row on posterior edge, and accompanied by a cluster of 5–6 short setae anteriorly and a cluster of 5–6 longer setae ventrally. Cercus long and broad, entirely covered with dense pubescence, bearing a number of long setae and a small cluster of short setae on posteroventral corner. Hypandrium markedly wider than long, posterior edge sinuous, 2 short paramedian setae, widely separated, anterior parameres ovoid and bearing short setulae apically. Aedeagus in lateral view, narrow basally and then bulky up to a thumb-like rounded distiphallus, bearing a belt of strong, blunt, tooth-like denticles medially ; in ventral view appearing narrower and distiphallus exhibits a long apical opening. Aedeagal apodeme slightly shorter than aedeagus and bent in its proximal third.

Ovipositor. Narrow apically, bearing on ventral edge a row of 10 short teeth of which 5 are grouped at apex, and followed by 3 short and thin setulae, a strong spine set back from apical group of teeth which is flanked by 2 long setae (one dorsal, one ventral). Spermathecae almost hemispherical, wall smooth with a few basal ridges, invaginated process long and narrow.

Length (in mm): *Male.* Body 2.4; wing 2.6. *Female.* Body 2.8; wing 2.6.

Material examined. TANZANIA: Holotype ♂, W-Usambara, Mazumbai, 21.iii.1996, swept on fungus; Paratypes, 4♂, 1♀, *idem*; 1♂, 1♀, *idem* but 20.III.1996; 1♀, *idem* but 18.III.1996 (Lachaise, Harry) (MNHNP); 2♂, E-Usambara, Amani, ii.1995 (Lachaise, Harry, Rasplus), 1♀, *idem* but 8.iii.1996 (Lachaise, Rasplus) (MNHNP); 1♂, MALAŴI, Ntchisi Forest Reserve, 1334Ac, alt. 1500 m, 3–4.xii.1980, montane forest & woodland (Londt & Stuckenberg) (NM).

Distribution. Tanzania, Malaŵi.

Etymology. Dedicated to David A. Barraclough.

Scaptomyza (*Metascaptomyza*) *dorsalis* Séguy, 1938

Material examined: MALAŴI: 1♀, Zomba Plateau, 13–14.xii.1980, alt. 1500 m, 1535Ad, montane forest (Londt & Stuckenberg) (NM).

Distribution. Kenya, Cameroun, Burundi, Malaŵi (new record).

Scaptomyza (*Metascaptomyza*) sp. aff. *dorsalis* Séguy, 1938

Material examined: MALAŴI: 1♀, Ntchisi Forest Reserve, 1334Ac, alt. 1500 m, 3–4.xii.1980, montane forest & woodland. (Londt & Stuckenberg) (NM). Registered specimens: S. F. McEvey 6647.

The species is closely related to *S.* (*M.*) *dorsalis* Séguy, differing mainly in the pale palpus, lack of longitudinal medial band on the face, and slight darkening of the frons (no band).

Zaprionus (*Zaprionus*) *vittiger* Coquillett, 1902

Material examined: MALAŴI: 1♂, Ntchisi Forest Reserve, 1334Ac, alt. 1500 m, 3–4.xii.1980, montane forest & woodland. (Londt & Stuckenberg) (NM). Registered specimens: S. F. McEvey 6640.

Distribution. South Africa, Malaŵi.

Zaprionus (*Zaprionus*) sp. aff. *taronus* Chassagnard & Tsacas, 1993

Material examined: MALAŴI: 1♂, Ntchisi Forest Reserve, 1334Ac, alt. 1500 m, 3–4.xii.1980, montane forest & woodland. (Londt & Stuckenberg) (NM). Registered specimens: S. F. McEvey 6642.

Zaprionus (*Zaprionus*) sp.

Material examined: MALAŴI: 1♀, Kasungu National Park, Lifupa camp, 1334Aa, alt. 1000 m, 9–10.xii.1980, *Brachystegia* (Stuckenberg & Londt); 1♀, Zomba Plateau, 13–14.xii.1980, alt. 1500 m, 1535Ad, montane forest (Londt & Stuckenberg) (NM). Registered specimens: S. F. McEvey 6653 & 6654.

DISCUSSION

Although limited to 21 specimens, Londt & Stuckenberg's collection of drosophilids from Malaŵi is notable as it includes three genera and five species which were not previously recorded from Malaŵi. Accordingly, the drosophilid fauna of Malaŵi now comprises 14 genera and 81 species.

The most interesting species in this collection were collected in the montane forest and woodland of the Ntchisi Forest Reserve at an elevation of 1500 m. The genus *Hypselothyrea* is a rare taxon that was described by De Meijere (1906) based on a species from New Guinea. It presently includes 18 species (Wheeler 1981). Seven species were described between 1906 and 1928 from India, Nepal, Sumatra, Taiwan, Japan, New Guinea, Australia and the Seychelles. Since then, no additional species were discovered for 46 years. Between 1974 and 1982, 11 new species were described from material collected in India, Sri Lanka, Malaysia, Sarawak, Thailand, the Philippines and New Guinea. In 1980, Okada proposed dividing the genus into two subgenera, *Deplanothyrea* (4 spp.) and *Hypselothyrea* (14 spp.). Although the old record of *Hypselothyrea* (*Deplanothyrea*) *notabilis* (Lamb) from the Seychelles (Lamb 1914) has since been complemented by a series of 6♀ and 3♂ collected in this archipelago by J. Rowley in March 1978, and identified by one of us (L. T.) in 1995, these records have remained isolated and puzzling for a genus that appeared otherwise strictly confined to the Oriental and Australasian Regions. We provide here evidence that the genus also occurs throughout the afrotropical mainland, since three unequivocal species of *Hypselothyrea* have been found, one from Malaŵi, and two from Nigeria. As with the species from the Seychelles, the three undescribed species from Africa can be assigned to the subgenus *Deplanothyrea*, which therefore now includes seven species. It may be of interest to note that *Deplanothyrea* is oriental and afrotropical, whereas the subgenus *Hypselothyrea* is oriental and australasian, the former being found in Seychelles, Malaŵi and Nigeria alone, while the latter is found only in New Guinea and Australasia. The geographical ranges of the two subgenera overlap mainly in India, that is in a geological extension of the Seychelles granitic archipelago. *Liodrosophila melania* is the second species of this genus reported from Malaŵi. Among other genera, *Hypselothyrea* and *Liodrosophila* are placed in the same tribe Hypselothyrini by Okada (1989). The sympatry of *Liodrosophila melania* with *Drosophila* (*Drosophila*) *adamisa* reported in Chassagnard *et al.* (1997) suggests biogeographical affinities between the Ntchisi submontane forest (1500 m) and Mt Elgon (2470 m) in western Kenya, while *Mycodrosophila* (*Mycodrosophila*) *barracloughi* sp.n., a fungus breeder, indicates affinities between Ntchisi forest and northeastern Tanzania (Eastern and Western Usambara). In contrast, the occurrence of *Stegana* (*Steganina*) *monochrous* on the Zomba Plateau strengthens the affinities between southern Malaŵi and South Africa (Natal).

Mount Mulanje at the southeasternmost border of Malaŵi has been unexplored for drosophilids, and the male of *Cacoxenus* (*Gitonides*) sp. recorded here at mid-altitude is the only record of a drosophilid ever collected on this mountain. However, this species is not confined to Mt Mulanje, since it was collected also in the Kasungu National Park in *Brachystegia* woodland. Two species, *Stegana* (*Steganina*) *monochrous* and *Drosophila* (*Drosophila*) sp., were collected in a forest patch on the Zomba plateau using a Malaise trap, which is generally not a suitable method for collecting drosophilds, but may yield unexpected and rare material, as exemplified by the *Stegana* representative.

ACKNOWLEDGEMENTS

We thank B. R. Stuckenberg for information on collecting sites and helpful comments on the manuscript.

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ERRATA

In Chassagnard *et al.* (1997): p. 72: Omit: «we redescribe the species to include it in the above key»; p. 100: Captions of Figs. 63 and 64 should be transposed; p. 105: Captions of Figs. 80 and 81 should be transposed.